

# TA-4650

*USA Model  
(former and new types)*

*E Model  
AEP Model*



## INTEGRATED STEREO AMPLIFIER

### SPECIFICATIONS

#### GENERAL

**System:** Power amplifier section:  
direct-coupled pure complementary  
symmetry circuitry  
Preamplifier:  
direct-coupled two-stage phono,  
flat and negative feed-back control  
circuitry

**Power Requirements:** 120 V ac, 60 Hz (USA model)  
110, 127, 220 or 240 V ac, 50/60 Hz,  
adjustable (AEP, model)  
100, 120, 220 or 240 V ac, 50/60 Hz,  
adjustable (E model)

**Power Consumption:** 270W (by IEC Standard)

**Dimensions:** approx.  
460(w) x 168(h) x 323(d) mm,  
18 1/8 x 6 5/8 x 12 3/4 inches (AEP model)  
430(w) x 168(h) x 323(d) mm,  
16 7/8 x 6 5/8 x 12 3/4 inches (E, USA model)  
including projecting parts and controls

**Weight:** approx.  
12.4 kg, 27 lb 5 oz (AEP model) in net  
11.5 kg, 25 lb 6 oz (E, USA model)  
15.2 kg, 33 lb 8 oz with shipping carton  
(AEP model)  
13.6 kg, 30 lb (E, USA model)

**Dynamic Power Output:** 100W (8  $\Omega$ )  
(IHF constant power  
supply method)  
90W (4  $\Omega$ )

**Power Bandwidth**  
(IHF): 5 Hz – 70 kHz

**Harmonic Distortion:** less than 0.1% at rated output  
less than 0.05% at 1W output  
**Distortion:** less than 0.1% at rated output  
(60 Hz: 7 kHz = 4:1) less than 0.05% at 1W output

**Frequency Response:** 2 Hz – 100 kHz  $\pm 0.2$  dB  
(at 1W output)

**S/N ratio:** greater than 110 dB, short-circuited  
input

**Residual Noise:** less than 0.005  $\mu$ W (8  $\Omega$ )

**Damping Factor:** 45 (8  $\Omega$ , at 1 kHz)

**Inputs:** POWER INPUT  
sensitivity 1V RMS (for rated output)  
impedance 50 k $\Omega$

**Outputs:** SPEAKER terminals A, B  
accept speakers of 4  $\Omega$  or more  
HEADPHONE jack  
accepts low- and high-impedance stereo  
headphones

(Continued on next page.)

#### POWER AMPLIFIER SECTION

##### Continuous RMS

**Power Output:** at 1 kHz  
(less than 0.1% THD,  
both channels driven  
simultaneously) 35 + 35W (8  $\Omega$ )  
30 + 30W (4  $\Omega$ )  
at 20 – 20,000 Hz  
30 + 30W (8  $\Omega$ )  
according to DIN 45500  
35 + 35W

# SONY®

## SERVICE MANUAL

## PREAMPLIFIER SECTION

Harmonic Distortion:	less than 0.05 % at rated output
Intermodulation (IM) Distortion:	less than 0.05 % at rated output
(60 Hz: 7 kHz = 4:1)	
Frequency response:	PHONO 1, 2 RIAA equalization $\pm 0.5$ dB TUNER AUX 1, 2 TAPE 1, 2 REC/PB (input) EXT ADPT 1, 2 (input)
	$10 \text{ Hz} - 100 \text{ kHz} \begin{smallmatrix} +0 \\ -2 \end{smallmatrix} \text{ dB}$
Tone Controls:	BASS: $\pm 10 \text{ dB}$ at 50 Hz (TURNOVER 250 Hz) $\pm 10 \text{ dB}$ at 100 Hz (TURNOVER 500 Hz) TREBLE: $\pm 10 \text{ dB}$ at 10 kHz (TURNOVER 2.5 kHz) $\pm 10 \text{ dB}$ at 20 kHz (TURNOVER 5 kHz)
Filters:	LOW: 6 dB/octave attenuation below 35 Hz HIGH: 6 dB/octave attenuation above 6 kHz
Loudness Switch:	+10 dB at 50 Hz (att. 30 dB) +3 dB at 10 kHz

## Inputs

	Sensitivity	Impedance	Maximum input capability*	S/N (weighting network)
PHONO 1, 2	2.5 mV	50 k $\Omega$	300 mV	greater than 70 dB (B)
AUX 1, 2 TAPE 1, 2 REC/PB (input) EXT ADPT 1, 2 (input)	150 mV	100 k $\Omega$		greater than 90 dB (A)

\* The maximum input capability is measured at a 0.05 % harmonic distortion.

## Outputs

	Output voltage	Impedance
REC OUT 1, 2	150 mV	4.7 k $\Omega$
PRE OUTPUT	1 V	3 k $\Omega$
REC/PB	17 mV	82 k $\Omega$
EXT ADPT 1, 2	150 mV	4.7 k $\Omega$

## Specification Label:

### USA model

<b>SONY®</b>	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-4650 AC 120V 60Hz 130W SERIAL NO. _____ MADE IN JAPAN
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### AEP model

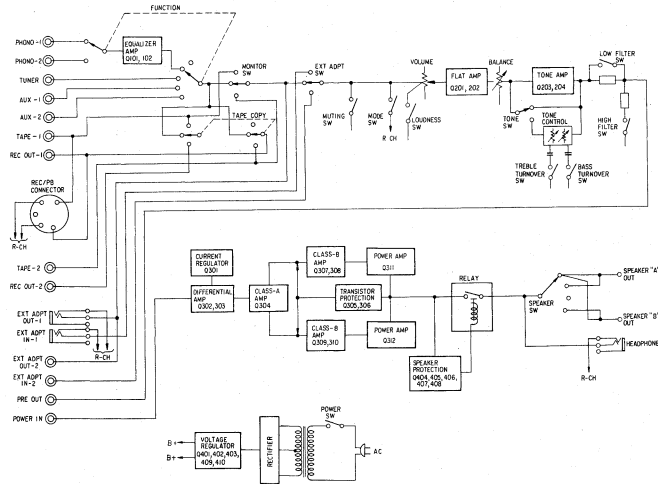
<b>SONY®</b>	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-4650 AC 110:127.220.240V ~ 50/60Hz 270W SERIAL NO. _____ MADE IN JAPAN
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### E model

<b>SONY®</b>	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-4650 AC 100:120.220.240V 50/60Hz 270W SERIAL NO. _____ MADE IN JAPAN
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## SECTION 1 OUTLINE

### 1-1. BLOCK DIAGRAM



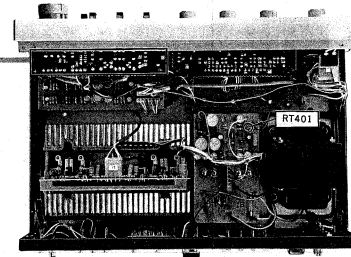
## SECTION 2 ADJUSTMENTS

Note: Turn POWER on and allow about three minutes for warm-up.

### 2-1. POWER SUPPLY VOLTAGE ADJUSTMENT

See Fig. 2-1 and 2-2.

B (volume control)  
board



Adjust RT401 for  
20 V reading on the  
meter with no signal  
input.

Fig. 2-1.

dc voltmeter



To ground of amp (TA-4650)

Fig. 2-2.

## 2.2. DC BIAS ADJUSTMENT

Adjust RT301 and RT351 for 75 mV reading on the meter with no signal input.

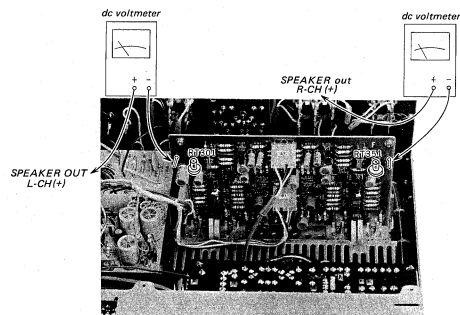
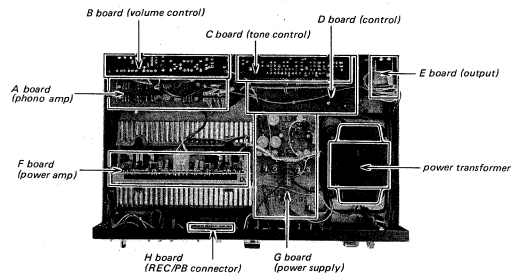


Fig. 2.3.

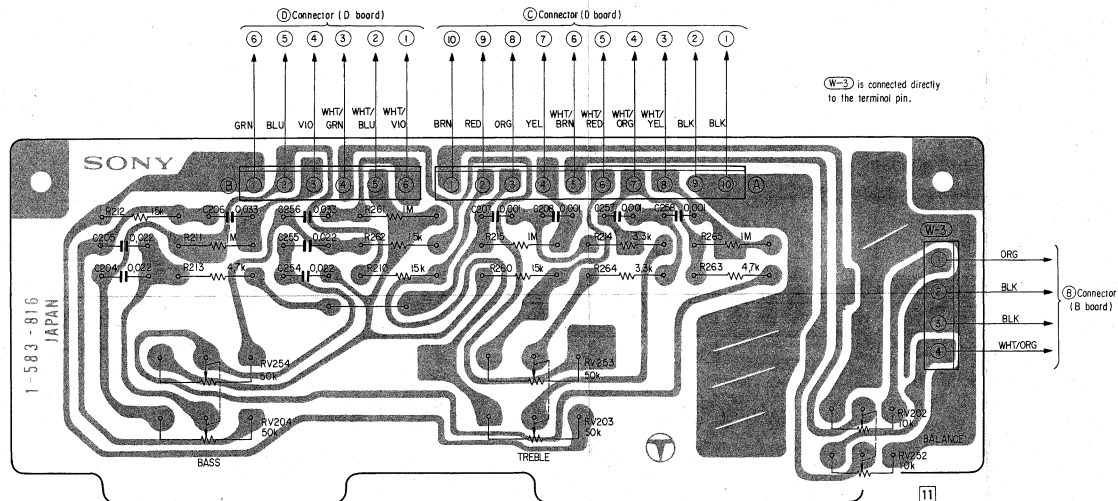
## 2.3. CHASSIS LAYOUT



## MEMO

# SECTION 3 DIAGRAMS

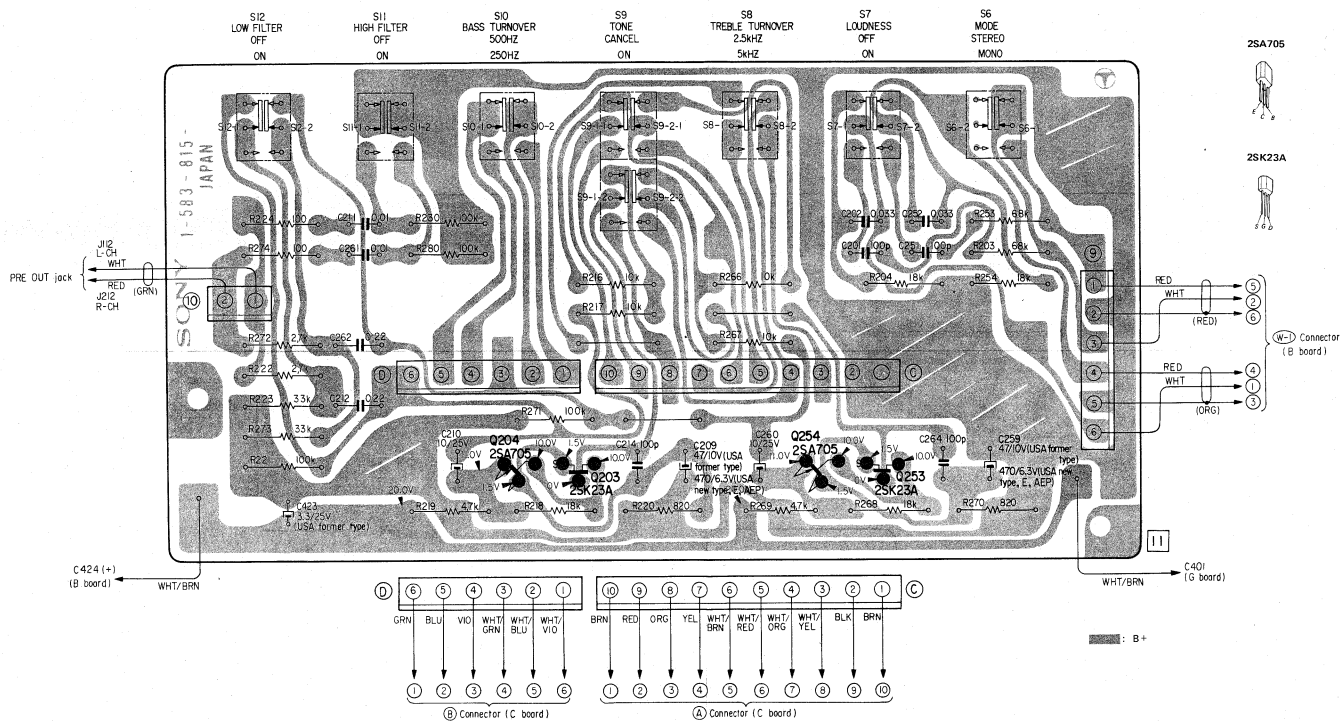
## 3-1. MOUNTING DIAGRAM — C Board (tone control) —



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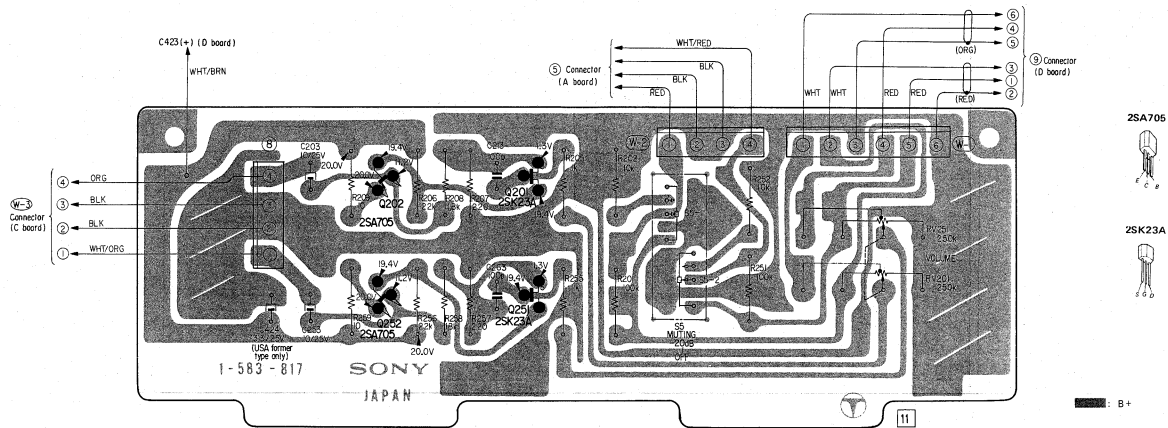
### 3-2. MOUNTING DIAGRAM – D Board (control) –

— Conductor Side —



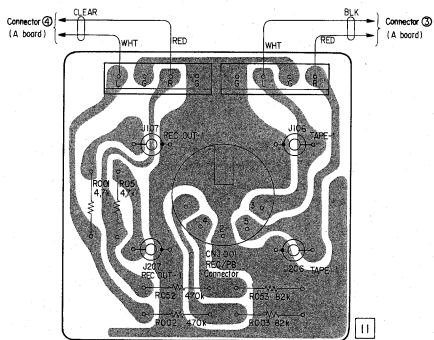
### 3-3. MOUNTING DIAGRAM — B Board (volume control) —

– Conductor Side –



### 3-4. MOUNTING DIAGRAM - H Board (BEC/PB connector)

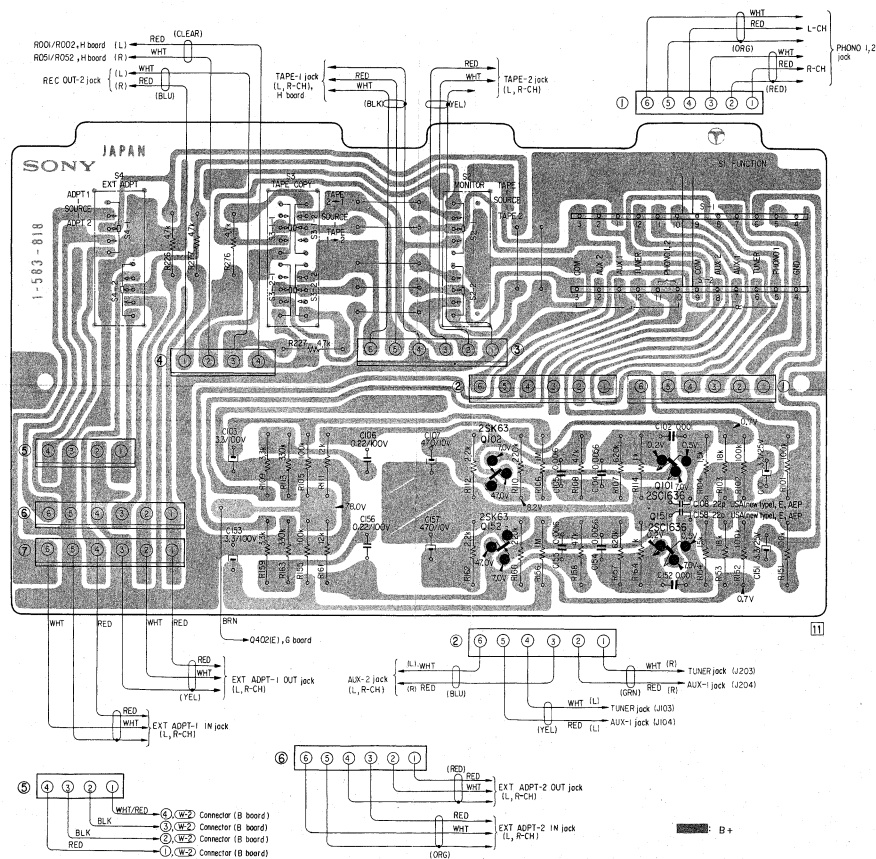
— Conductor Side —



**Note:** The lead wires of connectors (W-1) - (W-2) should wire-wrap the terminal pins of connectors (5) (A board) and (9) (D board), respectively.

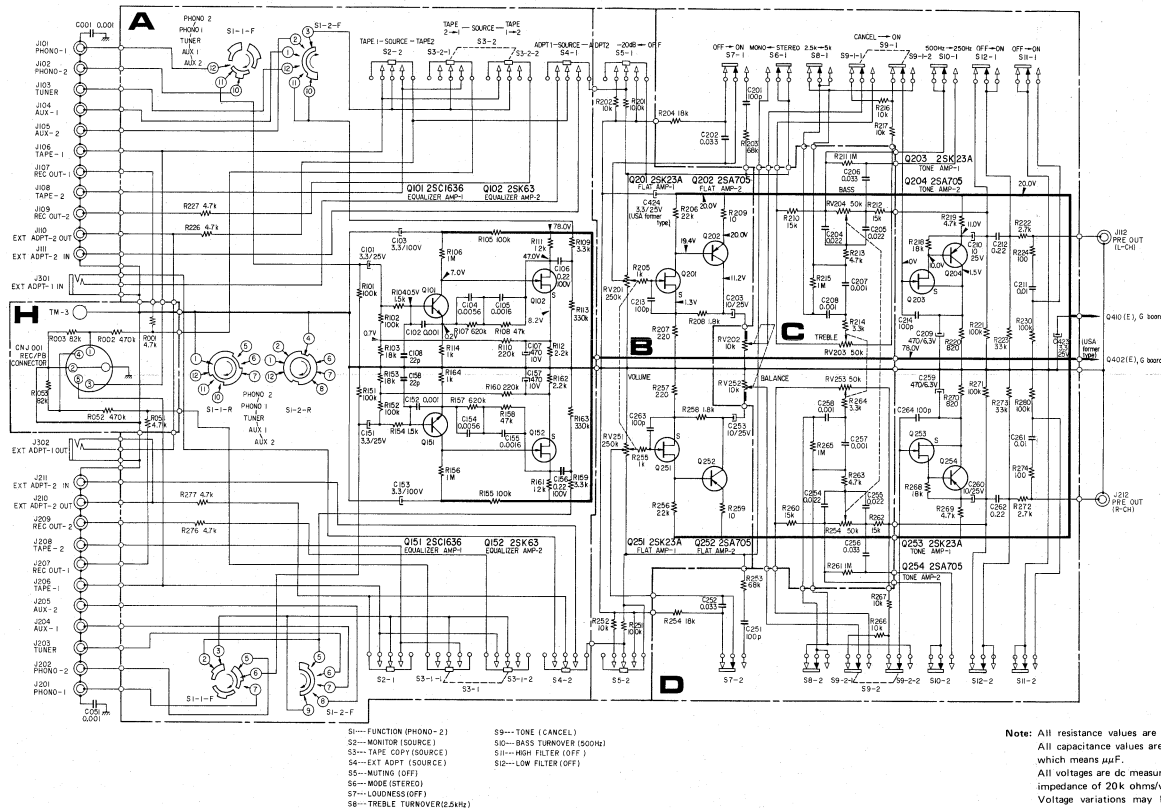
3-5. MOUNTING DIAGRAM - A Board (phono amp) -

- Conductor Side -



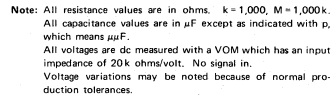


3.6. SCHEMATIC DIAGRAM - Preamplifier Section -



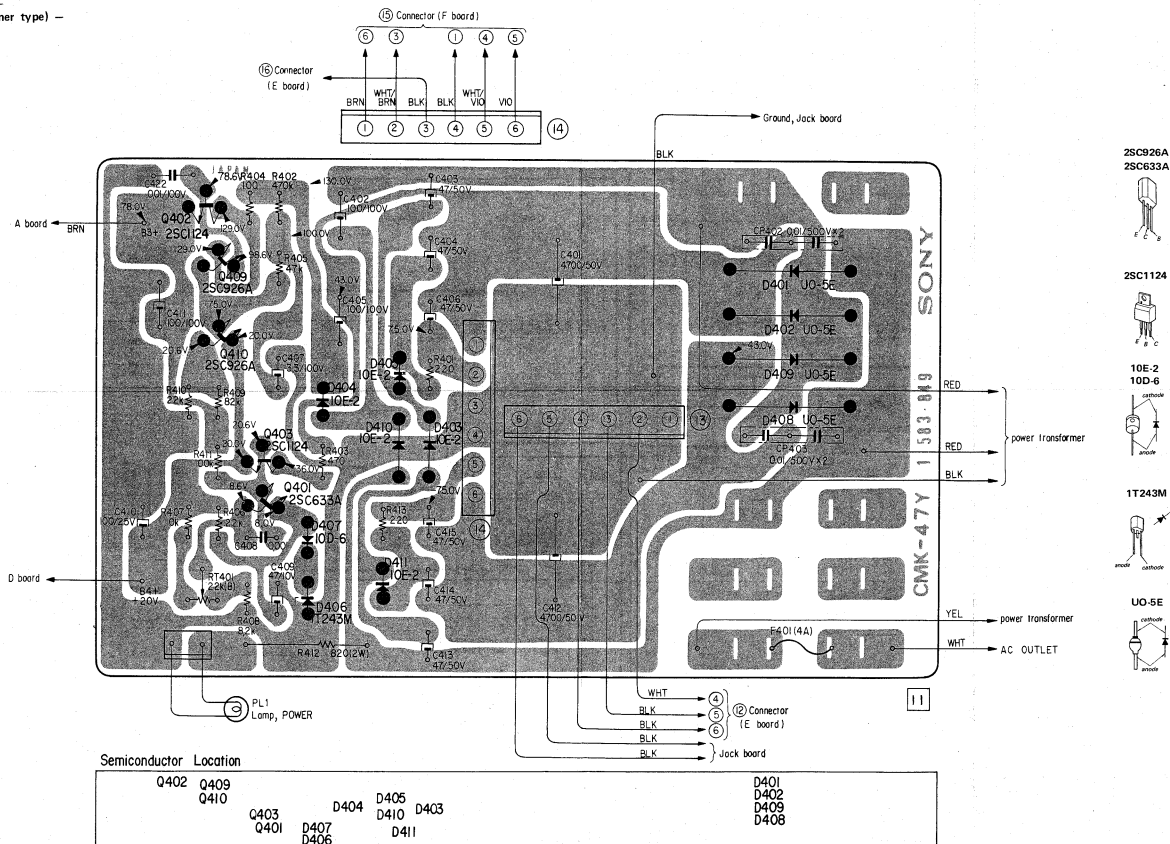
Note: All resistance values are in ohms. k=1,000, M=1,000k.  
 All capacitance values are in  $\mu\text{F}$  except as indicated with p, which means  $\mu\text{M}$ .  
 All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.  
 Voltage variations may be noted because of normal production tolerances.

3-7. SCHEMATIC DIAGRAM - Power Amplifier Section -  
- USA model (former type) -

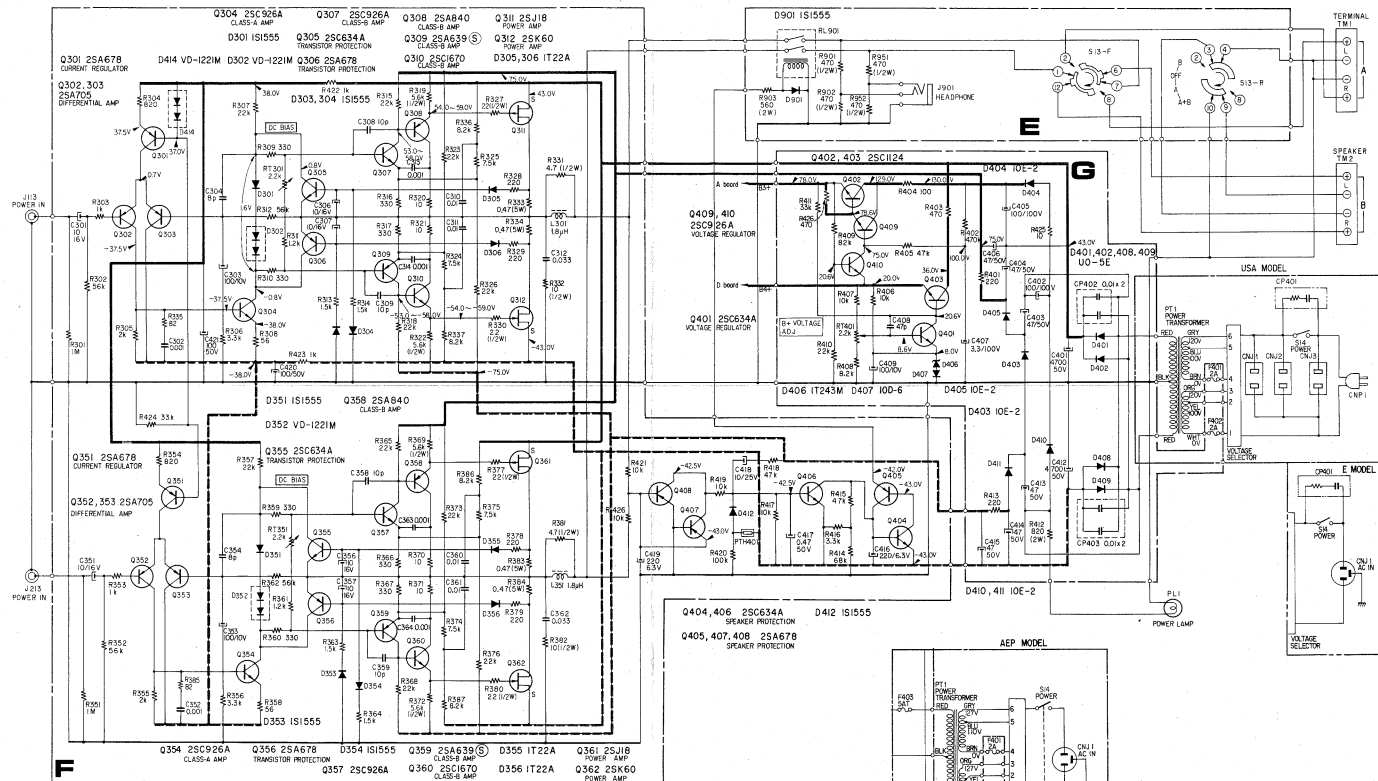


### 3-8. MOUNTING DIAGRAM — G Board (power supply) —

- Conductor Side -
- USA model (former type) -



3.9. SCHEMATIC DIAGRAM — Power Amplifier Section —  
— USA (new type), E, AEP model —

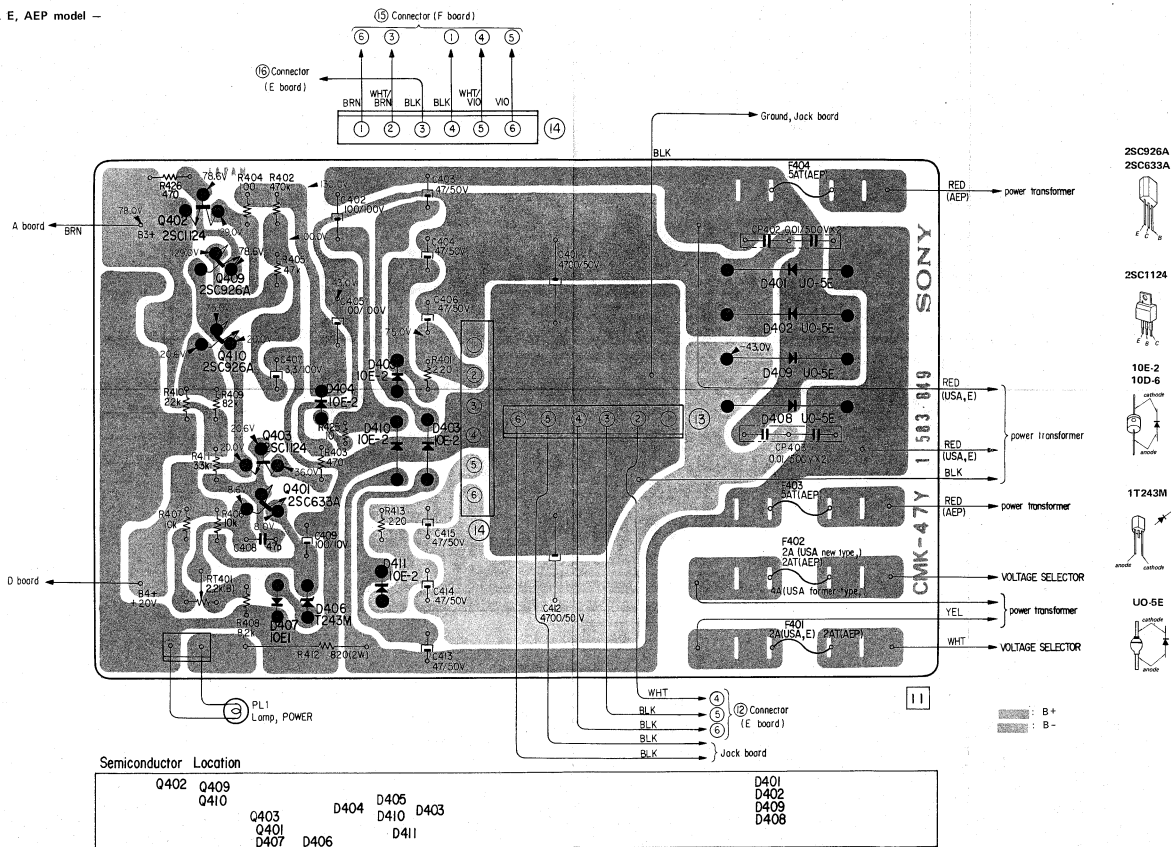


Note: All resistance values are in ohms. k=1,000, M=1,000k.  
All capacitance values are in  $\mu$ F except as indicated with p, which means  $\mu$ F.  
All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.  
Voltage variations may be noted because of normal production tolerances.

### 3-10. MOUNTING DIAGRAM — G Board (power supply) —

*Conductor Side —*

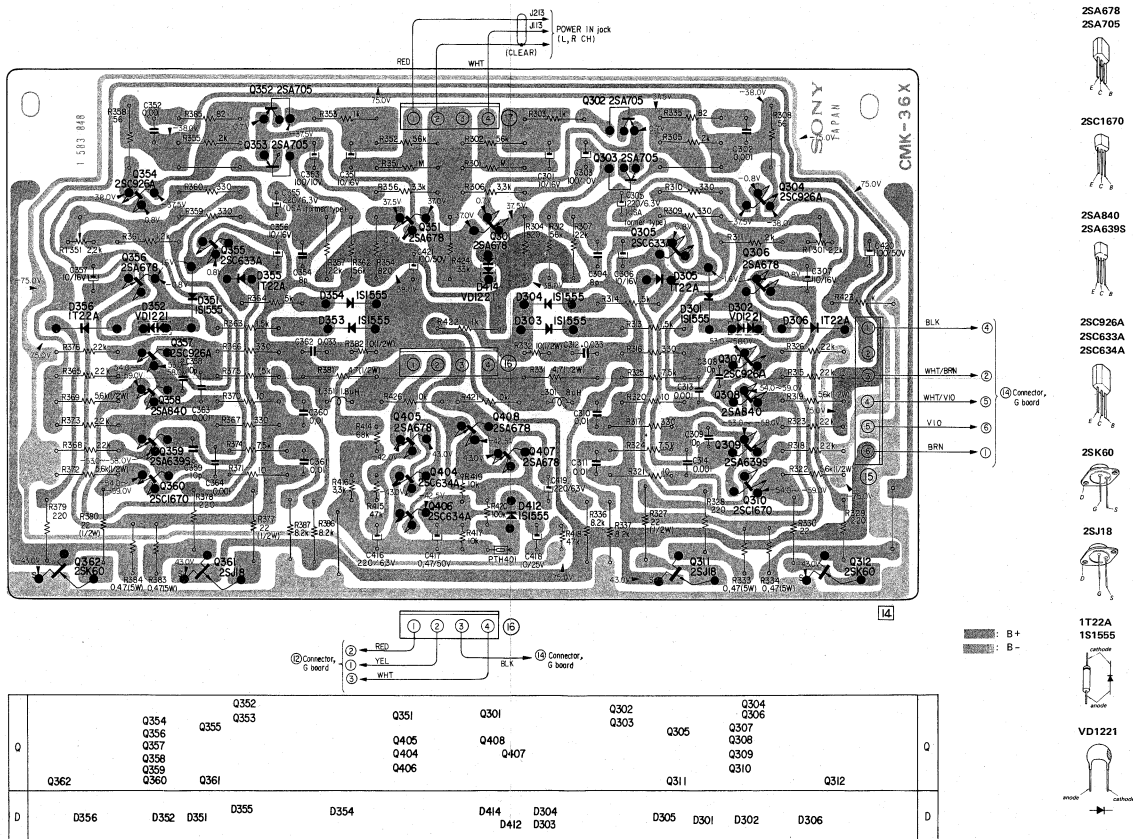
— USA (new type), E, AEP model —



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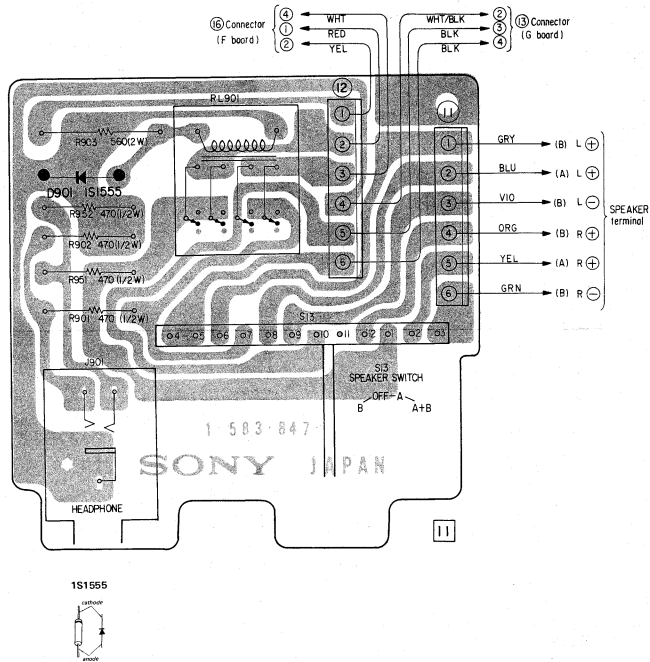
### 3-11. MOUNTING DIAGRAM — F Board (power amp) —

— Conductor Side —



## 3-12. MOUNTING DIAGRAM - E Board (output) -

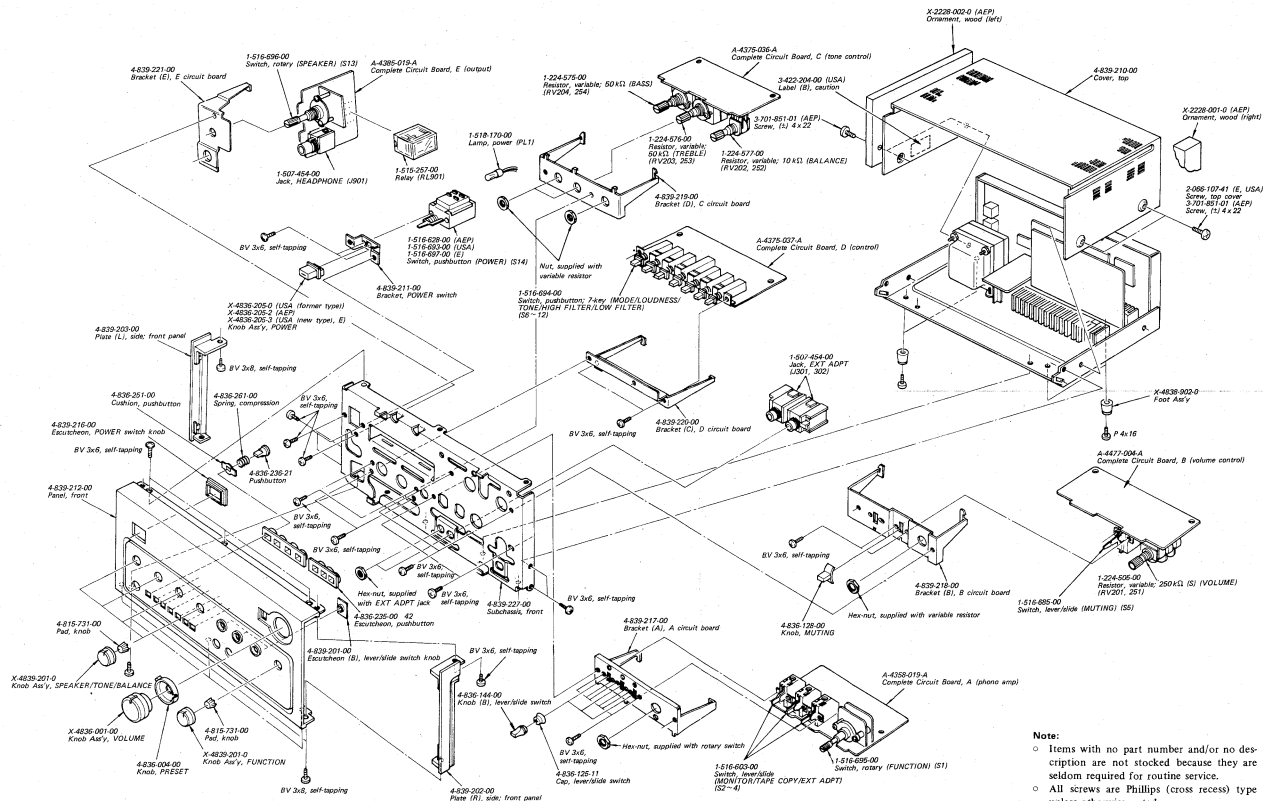
- Conductor Side -



## MEMO

# SECTION 4 EXPLODED VIEWS

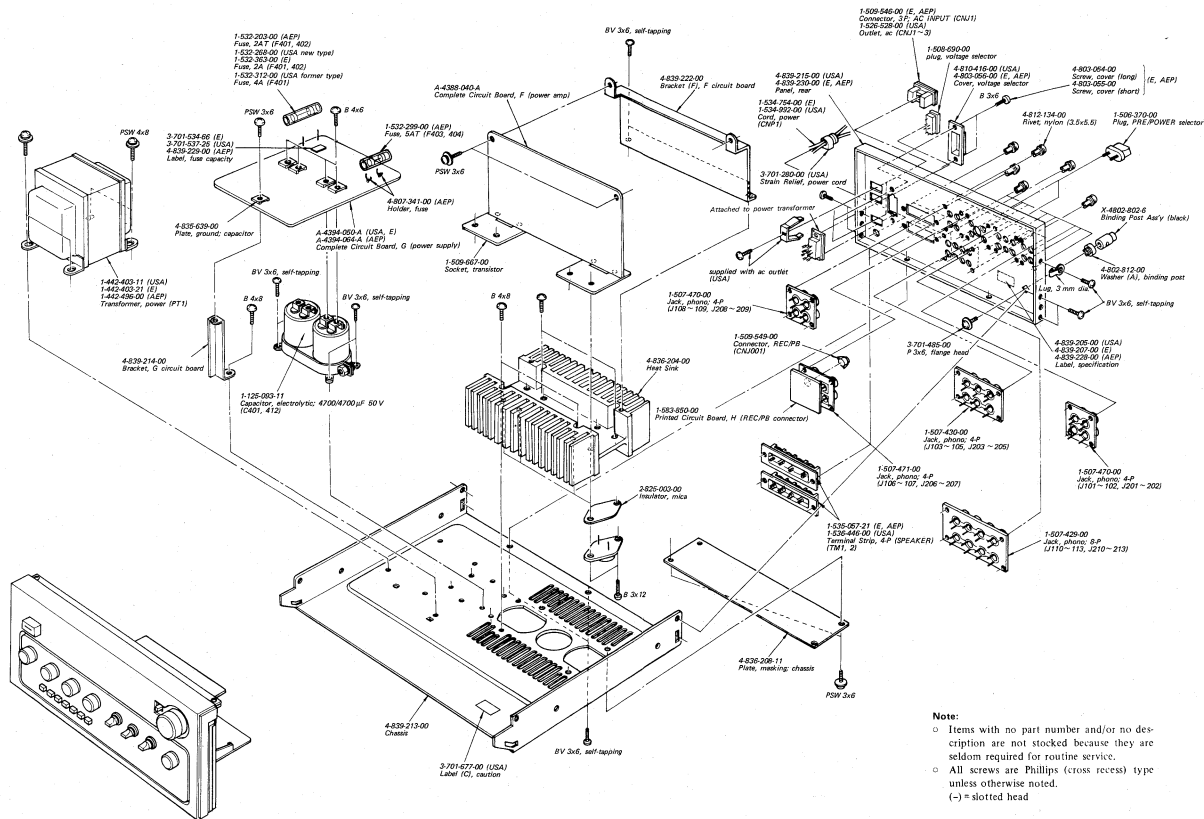
4-1.



**Note:**

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head





Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head

# SECTION 5 ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CIRCUIT BOARDS</b>					
<b>Note:</b> For USA model, former and new B, D, F and G boards are interchangeable respectively.					
A-4358-019-A		A (phono amp), complete	Q404	2SC634A	
A-4477-004-A		B (volume control), complete	Q405	2SA678	
A-4375-036-A		C (tone control), complete	Q406	2SC634A	
A-4375-037-A		D (control), complete	Q407,Q408	2SA678	
A-4385-019-A		E (output), complete	Q409,Q410	2SC926A	
A-4388-040-A		F (power amp), complete			
A-4394-050-A		G (power supply), complete			
		(USA, E model)			
A-4394-064-A		G (power supply), complete			
		(AEP model)			
1-583-850-00		H (REC/PB connector)			
<b>SEMICONDUCTORS</b>					
<b>Transistors</b>					
Q101(Q151)	2SC1636		D401,D402	UO-5E	
Q102(Q152)	2SK63 (FET)		D403-D405	10E-2	
			D406	1T243M	
Q201(Q251)	2SK23A (FET)		D407	10D-6	
Q202(Q252)	2SA705		D408,D409	UO-5E	
Q203(Q253)	2SK23A (FET)				
Q204(Q254)	2SA705				
Q301(Q351)	2SA678		D410,D411	10E-2	
Q302(Q352)	2SA705		D412,D413	1S1555	
Q303(Q353)	2SA705		D414	VD1221	
Q304(Q354)	2SC926A		D901	1S1555	
Q305(Q355)	2SC634A				
Q306(Q356)	2SA678				
Q307(Q357)	2SC926A				
Q308(Q358)	2SA840				
Q309(Q359)	2SA639S				
Q310(Q360)	2SC1670				
Q311(Q361)	2SJ18 (FET)				
Q312(Q362)	2SK60 (FET)				
Q401	2SC634A				
Q402,Q403	2SC1124				
<b>TRANSFORMER AND INDUCTORS</b>					
L301(L351)	1-407-592-00	Microinductor, 1.8 $\mu$ H			
PT1	1-442-403-11	Transformer, power (USA model)			
	1-442-403-21	Transformer, power (E model)			
	1-442-496-00	Transformer, power (AEP model)			
<b>CAPACITORS</b>					
Capacitors are in $\mu$ F, electrolytic type unless otherwise noted. (p= $\mu$ ) The working voltage of 50 volts or less are omitted except for electrolytic type.					
C001(C051)	1-102-074-11	0.001 ceramic			
C101(C151)	1-121-913-11	3.3 25 V			
C102(C152)	1-105-661-12	0.001 mylar			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C104(C154)	1-105-510-12	0.0056 mylar	C402	1-123-084-11	100 100 V
C105(C155)	1-106-006-12	0.0016 mylar	C403,C404	1-123-058-11	47 50 V
C106(C156)	1-105-729-12	0.22 100 V mylar	C405	1-123-084-11	100 100 V
C107(C157)	1-121-425-11	470 10 V	C406	1-123-058-11	47 50 V
C201(C251)	1-102-973-11	100 p ceramic	C407	1-121-995-11	3.3 100 V
C202(C252)	1-105-679-12	0.033 mylar	C408	1-105-661-12	0.001 mylar (USA (former type))
C203(C253)	1-121-748-11	10 25 V		1-101-881-11	47 p (USA (new type), E, AEP model)
C204(C254)	1-105-677-12	0.022 mylar		1-121-352-11	47 10 V (USA (former type))
C205(C255)	1-105-677-12	0.022 mylar		1-121-414-11	100 10 V (USA (new type), E, AEP model)
C206(C256)	1-105-679-12	0.033 mylar	C409	1-121-935-11	100 25 V (USA (former type))
C207(C257)	1-105-661-12	0.001 mylar	C411	1-123-084-11	100 100 V (USA (former type))
C208(C258)	1-105-661-12	0.001 mylar			
C209(C259)	1-121-352-11	47 10 V (USA (former type))	C412	1-125-093-11	4700 50 V
	1-121-424-11	470 6.3 V (USA (new type), E, AEP model)	C413-C415	1-123-058-11	47 50 V
C210(C260)	1-121-748-11	10 25 V	C416	1-121-419-11	220 6.3 V
C211(C261)	1-105-673-12	0.01 mylar	C417	1-121-726-11	0.47 50 V
C212(C262)	1-105-689-12	0.22 mylar	C418	1-121-398-11	10 25 V
C213(C263)	1-102-973-11	100 p ceramic	C419	1-121-419-11	220 6.3 V
C214(C264)	1-102-973-11	100 p ceramic	C420,C421	1-121-411-11	47 50 V (USA (former type))
				1-121-417-00	100 50 V (USA (new type), E, AEP model)
C301(C351)	1-121-916-11	10 16 V	C423,C424	1-121-392-11	3.3 25 V (USA (former type))
C302(C352)	1-105-661-12	0.001 mylar			
C303(C353)	1-121-352-11	47 10 V (USA (former type))			
	1-121-414-11	100 10 V (USA (new type), E, AEP model)			
C304(C354)	1-102-945-11	8 p ceramic			
C305(C355)	1-121-419-11	220 6.3 V (USA (former type))			
C306(C356)	1-121-413-11	100 6.3 V (USA (former type))			
	1-121-651-11	10 16 V (USA (new type), E, AEP model)			
C307(C357)	1-121-413-11	100 6.3 V (USA (former type))			
	1-121-651-11	10 16 V (USA (new type), E, AEP model)			
C308(C358)	1-102-947-11	10 p ceramic			
C309(C359)	1-102-947-11	10 p ceramic			
C310(C360)	1-105-673-12	0.01 mylar			
C311(C361)	1-105-673-12	0.01 mylar			
C312(C362)	1-105-679-12	0.033 mylar			
C313(C363)	1-105-661-12	0.001 mylar			
C314(C364)	1-105-661-12	0.001 mylar			
C401	1-125-093-11	4700 50 V			

## RESISTORS

All resistors are in  $\Omega$ ,  $\frac{1}{2}$  W,  $\pm 5\%$ , carbon resistors (except special type) are omitted.  
Check schematic diagram for the resistance values.  
(K = 1,000, M = 1,000 k)

R331(R381)	1-202-517-11	4.7 $\frac{1}{2}$ W composition
R332(R382)	1-202-525-11	10 $\frac{1}{2}$ W composition
R333(R383)	1-217-158-11	0.47 5 W metal
R334(R384)	1-217-158-11	0.47 5 W metal
R412	1-206-662-11	820 2 W metal-oxide
R901(R951)	1-202-565-11	470 $\frac{1}{2}$ W composition
R902(R952)	1-202-565-11	470 $\frac{1}{2}$ W composition
R903	1-206-658-11	560 2 W metal-oxide
RT301 (RT351)	1-224-489-00	2.2 k, adjustable (dc bias adj.)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
RT401	1-224-250-00	2.2k, adjustable (power voltage adj.)
RV201 (RV251)	1-224-505-00	250 k(S), variable (VOLUME)
RV202 (RV252)	1-224-577-00	10k, variable (BALANCE)
RV203 (RV253)	1-224-576-00	50k, variable (TREBLE)
RV204 (RV254)	1-224-575-00	50k, variable (BASS)

## SWITCHES

S1	1-516-695-00	Rotary (FUNCTION)
S2~S4	1-516-603-00	Lever/Slide (MONITOR, TAPE COPY, EXT ADPT)
S5	1-516-685-00	Lever/Slide (MUTING)
S6~S12	1-516-694-00	Pushbutton, 7-key (MODE, LOUDNESS, TONE, HIGH FILTER, LOW FILTER)
S13	1-516-696-00	Rotary (SPEAKER)
	1-516-628-00	Pushbutton (POWER) (AEP model)
S14	1-516-693-00	Pushbutton (POWER) (USA model)
	1-516-697-00	Pushbutton (POWER) (E model)

## JACKS

J101,J102 (J201,J202)	1-507-470-00	Phono, 4-P
J103~J105 (J203~J205)	1-507-430-00	Phono, 6-P
J106,J107 (J206,J207)	1-507-471-00	Phono, 4-P
J108,J109 (J208,J209)	1-507-470-00	Phono, 4-P
J110~J113 (J210~J213)	1-507-429-00	Phono, 8-P
J301,J302	1-507-454-00	EXT ADPT
J901	1-507-454-00	HEADPHONE

## MISCELLANEOUS

CNJ001	1-509-549-00	Connector, REC/PB
CNJ1	1-509-546-00	Connector, 3-P; AC INPUT (E, AEP model)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CNJ1~CNJ3	1-526-528-00	Outlet, ac (USA model)
CNP1	1-534-754-00 1-534-992-00	Cord, power (E model) Cord, power (USA model)
CP401	1-231-057-31	Encapsulated Component (USA, E model)
CP402 CP403	1-102-355-11	Capacitor, ceramic 0.01 $\mu$ F 500 V
	1-532-203-00	Fuse, 2AT (AEP model)
F401,F402	1-532-268-00 1-532-363-00	Fuse, 2A (USA model (new type)) Fuse, 2A (E model)
F401	1-532-312-00	Fuse, 4A (USA model (former type))
F403,F404	1-532-299-00	Fuse, SAT (AEP model)
PL1	1-518-170-00	Lamp, power
Pth401	1-800-340-00	Thermistor (positive)
RL901	1-515-257-00	Relay
TM1,TM2	1-535-057-21 1-536-446-00	Terminal Strip, 4-P (SPEAKER) (E, AEP model) Terminal Strip, 4-P (SPEAKER) (USA model)
	1-506-370-00	Plug, PRE/POWER selector
	1-508-690-00	Plug, voltage selector (USA model)
	1-509-667-00	Socket, transistor
	1-536-354-00	Pin, terminal

## ACCESSORIES AND PACKING MATERIALS

<u>Part No.</u>	<u>Description</u>
X-3701-029-0	Card Ass'y, warranty
1-506-113-00	Plug, shorting
3-429-126-00	Bag, polyethylene; unit
3-701-020-00	Bag, polyethylene; instruction manual
3-701-730-00	Bag, polyethylene; IBM card
3-701-742-00	Card, IBM
3-780-508-21	Manual, instruction (USA model)
3-780-508-11	Manual, instruction (AEP model)
	Manual, instruction (E model)
3-793-807-11	Schematic Diagram
4-839-225-00	Carton
4-839-226-00	Cushion